| TITLE : | Design of Smart Car Control System for Gesture Recognition Based on Arduino | YEAR |
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| | | 2021 |

| KEY CONTRIBUTION | THEORY |
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| A smart car control system, based on Bluetooth control for gesture recognition is designed, which uses the MPU6050 six-axis attitude sensor to collect attitude information as well as through multi-angle fusion and direction closed-loop control to create the corresponding digital gestures for different instructions | After the digital recognition, the relevant instructions are transmitted to the Arduino smart car via radio frequency, which realizes the remote control of the intelligent vehicle through human gestures to complete the corresponding command actions |

**DEPENDENT VARIABLES**

- The MPU6050 six-axis attitude sensor collects the hand posture change data, it passes the data to the sports glove microcontroller through filtering and calculation.
- The sports glove rotates around the Y-axis and X-axis to establish a 3D model to calculate the angle of the movement direction of the smart car.

**INDEPENDENT (AND HYPOTHESES)**

- The infrared obstacle avoidance module can assist the operator in controlling the car remotely
- gesture-controlled smart car is designed based on ATMEGA328P microcontroller
- adopts wireless frequency modulation technology compared to traditional smart cars.
- MPU6050 six-axis attitude sensor for gesture recognition

| METHODS | ANALYSIS |
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| The MPU6050 six-axis attitude sensor of the data glove will check the acceleration data of ACCEL_X, ACCEL_Y, ACCEL_Z and the gyroscope data of GYRO_X, GYRO_Y, GYRO_Z in real-time. | The Arduino-based gesture control smart car software level designed in this article includes the control glove terminal and the smart card terminal. The open-source platform, based on Arduino, carries on programming to each module, takes on the function test and then carries on the assembly. |

**FINDINGS**

- **The running results of roll angle and pitch angle can be obtained by reading the MPU6050 in real-time to verify three-axis acceleration data and three-axis gyroscope data, the Roll angle and Pitch angle.**
- **Proven no problem with the MPU6050 module, and the attitude angle can be calculated typically as the 3D motion state of the MPU6050 can be seen intuitively through the Processing demo interface.**
- **The smart car has good operability, controllability and stability that it can smoothly realize forward, backward, left, right and other functions**
- **Technical parameter; Response time:0.02s, Accuracy:98.5%, Stability:98%**

| FUTURE RECOMMENDATION/GAP | R E M A R K S | Gesture recognition using gloves. |
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| **improve and optimize the algorithm and apply this algorithm to the actual environment** | | |